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AUTHOR Cutler, Stephen J.
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ABSTRACT

Two evaluative efforts sought to assess the educational impact of computer applications in the social science curriculum. Questionnaires were administered to groups of students: 1) who either had just finished a section of a Principles of Sociology course at Oberlin College which dealt with computer-based research techniques in the social sciences; or 2) who had taken the section from one to three semesters earlier. The majority of both groups regarded the computer research material positively and felt it should be retained in the course. The skills learned were put to use in this and other courses, and the research curriculum increased the students' understanding of empirical literature. Responses to the questionnaires indicated that the students needed greater exposure to the discipline in order to handle data competently, that such exposure should be coupled with practical experience in empirical research projects, and that ways need to be developed to utilize in upper level courses the skills learned in the introductory course. Nevertheless, the overall conclusion was that the computer-based research curriculum was an important and well-received component of an introductory sociology course. (Author/LB)

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CURRENT AND RETROSPECTIVE STUDENT EVALUATIONS OF A COMPUTER-BASED RESEARCH CURRICULUM IN AN INTRODUCTORY SOCIOLOGY COURSE*

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Stephen J. Cutler
Department of Sociology-Anthropology
Oberlin College
Oberlin, Ohio 44074
(216) 774-1231

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As the incorporation of the computer into the undergraduate social science curriculum has become more widespread in recent years, the need for continuous and systematic evaluation of these endeavors has likewise increased. Perhaps the most straightforward statement to this effect is found in the title of a paper presented by Meyers[1] at the second Conference on Computers in the Undergraduate Curricula, "We Don't Know What We Are Doing." Although his assertion is probably less valid now as the accumulating evidence [1], [2], [3], begins to point to some salutary effects of computer utilization in the social science curricula, the need for additional evaluative data persists.

Moreover, there are other questions yet to be posed. However much we know about what we are doing, we surely know next to nothing about what we have done. This is more than a play on words; rather, it speaks to the necessarily myopic quality of the typical assessment instrument--"on-the-spot" course evaluations. While immediate feedback is often helpful in providing insight into student reaction to our computer-based curricular innovations, there is an equally important set of questions which on-the-spot evaluation cannot answer. How is the computer experience viewed from the perspective of hindsight? Does exposure to computer skills in an introductory course provide an important additional dimension of preparation for other courses within the same or in related disciplines? To what extent have the computer skills learned in an introductory course been used in other courses?

In other words, both short-run and long-term evaluative questions must be asked in order to assess the educational impact of computer applications in the social science curricula. The present paper is concerned with both types of questions. In the context of an introductory sociology course which has a computer-based research component as an integral part, two sets of evaluations are analyzed: (a) evaluations submitted by students upon completion of the course; and (b) retrospective evaluations from students who took the course from one to three semesters previously.

A Brief Description Of The Course And The Computer Curriculum

Average enrollment in the Principles of Sociology course at Oberlin College is 45 students per section with three to four sections available each semester. The course itself is divided into two parts. In the first half, students are introduced to the basic principles of sociology through lectures, readings, and class discussion. A student may elect to take this segment only and, upon successful completion, receive two hours of credit as well as prerequisite credit for many upper level courses. For students who elect to take the entire course (typically two-thirds to three-quarters of the original enrollment), the emphasis in the second part is on the application of the principles to individual projects. In my own sections, the computer-based research curriculum is introduced at the beginning of the second part of the course[5].

The research curriculum takes five 65-minute class sessions:

1. The first session provides students with a brief and general introduction to research methods. Topics included are the reciprocal relationship between theory and research, a comparative analysis of several major research strategies, and a discussion of sampling. Arrangements are also made for students to receive instruction in keypunching.

2. In the second session, detailed consideration is given to the structure of data sets, the use of codebooks, the mechanics of using DATPACK to replicate a major finding taken from the sociological literature employing one of our own data sets, and job submission procedures. Students are assigned the submission of a pre-selected run which is to be discussed in the third session.

3. This class period is used to examine carefully the output from the assigned run. Because the output involves a bivariate relationship, we discuss the proper

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direction in which to percentage a table, the substantive nature of the relationship, the use and meaning of observed and expected frequencies, and chi-square as a test of significance. In preparation for the following session, consideration is given to the mechanics of controlling for a third variable and to procedures for recoding and collapsing categories. The assignment for the following session in the resubmission of the original run with the addition of a theoretically relevant control variable.

4. In the fourth session, consideration is given to the process of elaboration and to the various ways in which the relationship between two variables might be modified when a control variable is used. The assigned output is then examined to apply the principles of elaboration. In preparation for the next session, students are given instruction in obtaining univariate frequency distributions and are assigned a problem requiring the frequency distributions for several variables.

5. In the final session, the several uses of univariate distributions are discussed in conjunction with the assigned output. Also considered is the application of DAPPACK to other data sets, the use of multiple control variables, and several other options available in DAPPACK[6].

Toward the end of the research curriculum, students are given a catalogue containing brief descriptions of the approximately twenty-five data sets available for their use. They are asked to submit a statement of a proposed research project involving either computer-based data analysis or the more traditional library research. On the basis of these proposals, the students are assigned to small groups, comprised of students with similar substantive interests, which meet weekly for progress reports and discussion of their individual projects. A term paper, reporting the results of their research, is required of all students.

Course Evaluation

The evaluation of this computer-based research curriculum in the introductory sociology course is derived from two sets of data. The first data source is a series of questionnaires[7] given to the students in my section of the introductory sociology course in the Fall of 1972. Information is available from 26 of the 28 students who were enrolled for the full four hours.

The second set of data comes from a course evaluation questionnaire sent to students who were enrolled in my sections of the course during the three previous semesters in which the computer curriculum was offered. No attempts were made to contact students who had graduated, withdrawn from college, or enrolled in off-campus study programs. Thus, of the 78 students enrolled for the full four hours, 58 were eligible and returns were received, after one follow-up, from 42 students or 72% of the eligible sample.

Evaluations From Current Students

From several perspectives, the data indicate that the majority of students viewed the computer-based research curriculum in positive terms. In response to the question "Was the two week period spent on research methods valuable to you," 71% of the 26 students answered in the affirmative. Illustrative of the favorable comments are the following:

> Now I know how to get data from any of the data sets Oberlin has. I have learned something about the way computers work.
>
> It gave one at the least a minimal working familiarity with using the computer in research and also an ability to read and understand the tables and references concerning research in various periodicals and books.

On the negative side, the following comments are typical of those made by students who did not think that the computer curriculum was valuable to them:

> I couldn't understand it very well.
>
> I didn't utilize the knowledge any further and I don't think that I will.

Quite apart from the personal value of the computer curriculum, the students were asked whether the sessions on research methods should be retained in future offerings of the course. The overwhelming majority indicated that the research curriculum should remain a

part of the course with only 4% disagreeing. However, while most of the students favored retention of this component of the course, 63% felt that the research curriculum should be made optional while 33% thought it should be required. Two themes consistently appeared in the qualitative responses. On the one hand, several students commented that where a choice is given between working on an empirical research project and a library research project, the computer curriculum is apt to be far less meaningful and unimportant to persons who select the latter.

On the other hand, those who indicated that the computer curriculum should be required often noted that apprehension would cause many students to miss a good experience if it were not required.

One further bit of evidence supports this notion that required exposure to the computer curriculum facilitates a positive attitude toward the experience. In each of the three questionnaires administered during the term, the students were asked whether they thought "that an elementary introduction to computer-based methods of data analysis should be part of an introductory sociology course." At the very beginning of the course, only 31% of the students enrolled for the full four hours responded "yes." At the end of the first part of the term, the proportion saying yes had increased slightly to 35%. At the end of the second part of the term, however, 60% of the students agreed that such an experience should be part of an introductory sociology course.

Not only is the evaluation of the computer curriculum predominantly positive, but there are also indications that the majority of students expect to use these skills in a variety of ways in other courses. Thus, 62% of the students answered in the affirmative to the question "Do you plan to take any more courses or do work in other courses that will allow you to make use of these skills."

The data discussed to this point suggest a generally favorable response to the computer-based research curriculum itself. More detailed analysis of the data, however, shows that such responses are associated with whether the student made further use of these skills in the course by undertaking an empirical research project. The data in Table 1 indicate that students who pursued a computer project involving secondary analysis of data rather than a library research project were more likely to say that the two week period spent on research methods was valuable, that these sessions ought to be retained, that an elementary introduction to computer-based methods of data analysis should be part of an introductory sociology course, and that they plan to utilize these skills in other courses. Students who conducted empirical projects were more likely to say that the sociology course was the best of the introductory courses they had taken, and they also planned to take more courses in the department than did those who pursued a library research project. Finally, in terms of both what they learned from their research project and their interest in it, a larger proportion of those doing computer work stated that their projects were both very valuable and very interesting. Perhaps the most enthusiastic (and gratifying) comments were those relating to the students' evaluations of their empirical research projects:

TABLE 1
Comparison of evaluations from students doing computer-based empirical projects and students doing library research projects

	Empirical Projects	Library Projects
% YES: Was the two week period spent on research methods valuable to you?	83%	62%
% RETAIN: Should these sessions on research methods be retained in the future?	100%	92%
% YES: Should an elementary introduction to computer-based methods of data analysis be part of an introductory sociology course?	73%	50%
% YES: Do you plan to take any more courses or do work in other courses that will allow you to make use of these skills?	100%	39%
% IT HAS BEEN THE BEST: How did Sociology 101 stack up against other introductory courses you've taken?	27%	8%
Beyond Sociology 101, how much more sociology do you expect to take?		
None, probably	0%	21%
Maybe one or two more courses	46	43
Certainly plan to take some other courses	36	29
Thinking about majoring or at least minoring in sociology	18	7
% VERY VALUABLE: In terms of what you learned from it, how would you characterize your individual project?	91%	79%
% VERY INTERESTING: In terms of your interest in it, how would you characterize your individual project?	91%	79%
Number of students	(11)	(15)

> I have gained valuable experience in using empirical data to substantiate hypotheses . . . I also learned how to make use of a computer system that will give me access to data for other projects.

> I really like running data on the computer and trying to predict my results . . . I really got involved in the problems I was studying and now I hope to do more research on them.

Evaluations From Previous Students

The retrospective evaluations of the computer-based research curriculum provided by previous students are very much in accord with those of the current students. When asked whether the two week period spent on research methods was valuable, 76% of the 42 students indicated that it was. The reasons cited were quite varied:

> It was fun. I enjoyed being able to experiment on the computer. It gave me a much clearer understanding of some of the basics of sociological research techniques. I also helped me understand the charts and statistics I encountered in my reading.

> If nothing else, it changed my opinion that sociology is nothing but book after book of fancy but meaningless rhetoric. Also, I believe everybody should have some kind of exposure to the computer . . . like medicine, it's good for you.

Here again, however, responses varied by whether the student pursued an empirical research project or a library research project. Of those who conducted a computer-based secondary

analysis of one of our data sets, 91% (N = 23) said that the research curriculum was valuable, while 56% (N = 19) of those whose term projects were based on library research indicated that the curriculum was valuable. Thus, a clear majority of both groups of students view this experience in retrospect as having been valuable although it would appear to be considerably more so for students who utilized the skills in their term projects.

As was the case with the current students, most of the former students (93% of the total group; 96% of the students doing empirical projects and 89% of those doing library research projects) suggest that the research curriculum should be retained in future offerings of the course. However, 61% indicated that the curriculum should be offered on an optional basis with only 32% saying that it should be required of all students. Those suggesting that the sessions should be optional generally pointed to differences among students in their backgrounds and interests with the implication that the course should be sufficiently flexible to accommodate such diversity:

> Some people have had the experience previously and probably don't need an introduction again. Others might prefer to be exposed later, and probably will be more positive about the rest of the course if not forced to handle research methods.

At the same time, students arguing that the computer-based curriculum should be a required component of the course noted several beneficial results regardless of student interest:

> It really helps you understand what you are reading.

> Empirical research is playing an increasingly important role in practically all fields and therefore I feel it is important to have an exposure to it.

The former students were also asked a series of questions about whether they have had an opportunity to use the computer and empirical skills in other courses or whether they planned to take any courses or do work in other courses that would allow them to make use of the skills. In terms of actual use, 21% of the 42 students indicated that they had made use of these skills in other courses, and all but one of these students expected to make further use of them in additional courses. Of the students who had not used the skills, 41% planned to take courses in which the computer and empirical techniques acquired in the introductory sociology course could be used. When actual use and expected use are considered together, fully 50% of the previous students either have used or still expect to use the computer-based empirical skills in their work in other courses.

The actual uses to which these skills have been put range widely. Some students said that the general empirical skills they acquired had served them well in understanding empirical data they read. Others noted that the computer experience itself yielded an additional dimension of preparation for other courses. Still others cited specific courses they intended to take, such as research methods, or particular empirical studies they planned to conduct in the context of upper-level substantive courses. It would appear, therefore, that there has already been some carry over and that the potential for even more is clearly in evidence.

Discussion

The data presented in the previous sections indicate that this computer-based research curriculum in the introductory sociology course is generally viewed in highly positive terms. The majority of students consider the curriculum to have been valuable and virtually all students are in favor of its retention in the course. Both the specific computer skills and the more general empirical skills have been used by some students in other courses and many more expect to make use of the skills. Perhaps most important are the comments of several students that the research curriculum has provided them with a greater facility to comprehend the social science literature they encounter throughout their course work. In short, the results point to the conclusion that a computer-based research curriculum is an important and well-received component of an introductory sociology course. Nevertheless, several problem areas apparent from the evaluations and from instructional experience with the curriculum merit brief mention.

A first problem is one which did not appear in the course evaluations but which has been very much in evidence in the small group discussions. Although the students are able to learn computer skills readily and are able in short order to use the computer to generate data without any real difficulty, what is more problematic, and particularly in the case of introductory students, is insuring that they have sufficient exposure to the discipline to enable them to grasp the essentials of data presentation, discussion, and interpretation. Thus, it has proven extremely useful to have several carefully selected empirical articles

available as models. The provision of such examples has repeatedly been instrumental in reducing student frustration at the final stages of data analysis.

A second problem is suggested by the evaluations. It would appear that the fullest potential of a computer-based research curriculum is not met unless such exposure is coupled with an opportunity to develop and to utilize these skills through term projects involving empirical research. This, however, raises a very familiar and fundamental question. Although the majority of students expressed the preference that the research curriculum itself be an option, there was ample testimony that many students would not have availed themselves of this opportunity had it not been a requirement. Likewise, there is the possibility that requiring an empirical paper might elicit even more interest. At issue here, of course, is the more general question of whether one wishes to adopt an interest model or a prescriptive model.

A final question relates to the optimal manner in which the skills acquired in the beginning course can be utilized in upper level courses. To date, most of our energies have been focused on the introductory course, and little has been done explicitly to promote the option of computer-based empirical research in our upper level substantive courses. Given both the positive student response and the existence of a sufficiently wide range of data sets with variables appropriate to almost any course in the department, it is clear that future efforts should be directed at ways to coordinate and to formalize the extension of computer-based empirical opportunities throughout the departmental curriculum.

NOTES AND REFERENCES

1. Edmund D. Meyers, Jr., We don't know what we are doing, Proceedings of the Conference on Computers in the Undergraduate Curricula, Hanover, New Hampshire, 1971.

2. Bruce D. Bowen and Wayne K. Davis, VOTER: A social science data analysis program. Proceedings of the Conference on Computers in the Undergraduate Curricula, Atlanta, Georgia, 1972.

3. Marc S. Weiss, PSYSTAT - A teaching aid for introductory statistics, Proceedings of the Conference on Computers in the Undergraduate Curricula, Atlanta, Georgia, 1972.

4. Stephen J. Cutler and David V. Blagg, Computer applications in the undergraduate sociology curriculum at Oberlin College. Proceedings of the Conference on Computers in the Undergraduate Curricula, Hanover, New Hampshire, 1971.

5. A detailed description of the actual computer curriculum and its rationale has been presented earlier [4]. This section, therefore, will present only a very brief overview of the essentials of the curriculum.

6. In addition to the class discussions, a number of documents (e.g., "The Relationship Between Theory and Research," "An Introduction to DAPPACK," "Chi-Square," "On Constructing and Reading Tables") have been prepared for distribution to the students for further guidance and reference.

7. These questionnaires were administered on the first day of classes, at the end of the first part of the term, and at the end of the second part of the term.

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